

A REVISION OF PHYMOSIA (MALVACEAE)

PAUL A. FRYXELL

Plant Science Division, Agricultural Research Service,
U.S. Department of Agriculture,
Department of Soil and Crop Sciences,
Texas A&M University, College Station 77843

Although *Phymosia* Desv. ex Hamilt. was described more than 140 years ago, and includes species that have been cultivated for an even greater time, the systematics of the genus has never been treated comprehensively. Kearney (1951) presented the only previous coherent account of *Phymosia*, and it is very brief.

Bates (1968) dealt with the placement of this genus within the tribe Malveae, and noted an alliance of *Phymosia* with *Malacothamnus* Greene and *Iliamna* Greene that stands distinctly apart from the *Sphaeralcea* alliance. He notes that, "within this alliance . . . *Phymosia* embodies the most primitive character expressions." I agree fully with this view and simply add that the relatively more arboreal habit and montane tropical distribution of *Phymosia* serve to emphasize this more primitive position.

The American Malvaceae are only rarely arborescent and only rarely montane in distribution. In addition to *Phymosia*, only *Wercklea* Pitt. & Standl. and *Abutilon* sect. *Tetrasida* (Ulbr.) Krap. may be placed in this category, although certain species of *Robinsonella* Rose & Bak. f. may also be regarded as montane (Fryxell, 1972). (The perennial herbs of the high Andes [e.g., *Nototriche* Turcz. and *Tarasa* Phil.] are excluded because of their obviously derivative nature.) It is interesting that these two characteristics are so combined in *Phymosia*, in view of the prevailing opinion (cf. Takhtajan, 1969) that the angiosperms originated under tropical montane conditions, and that relatively more primitive types may be more commonly encountered in such areas. The relatively primitive character expressions of *Phymosia* are thus underscored by the predominantly tropical montane distribution of the genus.

The genus is small and wholly from the tropics. One species is Caribbean, and the remainder are from Mexico and Guatemala. Typically, *Phymosia* occurs at elevations of 2000–3000 m, except that *P. umbellata* is found at somewhat lower elevations, and the Caribbean *P. abutiloides* may be found near sea level. Britton and Millspaugh (1920), who stated that the genus contains about 40 species, some South African, evidently confused *Phymosia* with other genera, including *Anisodonteia* Presl. Some of the species are cultivated for their showy flowers in their native areas, and some of these were introduced as ornamentals in colonial days into the gardens and greenhouses of Europe. In fact, many handsome illustrations of these plants are to be found in the botanical literature of the

TABLE 1. PUBLISHED ILLUSTRATIONS OF SPECIES OF PHYMOSIA.
Color plates are marked with an asterisk.

P. abutiloides. Catesby, Nat. Hist. Carol. 1: t. 77. 1731; Dillenius, Hort. Eltham. t. 1, f. 1. 1732; Cavanilles, Dissert. 2:t.16, f.2. 1786; Jacquin, Pl. Hort. Schoenbr. 3:t. 293. 1798*; Sims, Bot. Mag. 52:t. 2544. 1825*; Don, Garden 48:t. 1023. 1895; Kearney, Univ. Calif. Publ. Bot. 19: t. 1, f. B, F. 1935.

P. umbellata. Cavanilles, Icones 1:t.95. 1791; Cavanilles, Icones 5:t. 500bis, f. 104. 1799; Kerner, Hort. Sempervir. t. 459. 1816*; Schrank, Samml. Zierpfl. t. 12. 1817*; Loddiges, Bot. Cab. 3:t.222. 1818*; Loiseleur Deslongchamps, Herb. Amat. 7:t.439. 1824*; Drapiez, Herb. Amat. Fl. 3:t. 169. 1829*; Nees and Sinnig, Samml. Schonbluh Gew. t. 58. 1829 *; Bot. Reg. 19:t.1608. 1833*; Piccioli, Anotr. Colt. Fiori 2:t. 64. 1834*; Loudon, Fl. Gard. Orn. Gr. Pl. 6: 21. 1848; Jour. Hort. Ser. 3, 10: 63. 1885; Alexander, Addisonia 17: t. 555. 1932. Kearney, Univ. Calif. Publ. Bot. 19: t. 1, f. C, D. 1935.

P. rosea. Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 2:t. 9. 1837; Planchon, Fl. des Serres 7:t. 726. 1851-2; Paxton, Fl. Gard. 3:173. 1853; DeCandolle, Calq. Dess. Fl. Mex. t. 58. 1874; Chancrin & Dumont, Larousee Agric. Encycl. Ill. 2:t, 1871; Kearney, Univ. Calif. Publ. Bot. 19; t. 1, f. E. 1935.

18th and 19th centuries (Table 1). The earliest such illustration is that of Catesby, who according to Dillenius (1732), introduced seeds of *P. abutiloides* into greenhouse culture.

It is with Catesby's seeds that we must begin in a consideration of the typification of the generic name. Dillenius grew a plant from these seeds that became the subject of a plate (t. 1, f. 1) in *Hortus Elthamensis* (Dillenius, 1732). Schmidt (1965) described a copy of this work from the library of Linnaeus that contains Linnaeus' marginal notations, and which definitely verifies that the Dillenian plate is the type of *Malva abutiloides* L. Schmidt reproduced a portion of this particular Dillenian plate (Schmidt, 1965, plate XXI) showing the Linnaean binomial in Linnaeus' own hand. This correspondence is significant, because the two specimens in the Linnaean herbarium that bear this binomial are of a different plant [*Anisodonteia elegans* (Cav.) Bates from South Africa], and the annotations they bear are not in Linnaeus' hand but in the hand of the younger Linnaeus and of Thunberg (Savage, 1945; Bates, 1969). These specimens, therefore, have no bearing on the typification of *Malva abutiloides* L. (non L. f.); rather, Dillenius' plate (t. 1, f. 1) typifies *Malva abutiloides* L., which in turn is the nomenclatural type of the genus *Phymosia* Desvaux ex Hamilton. The Linnaean epithet has been used in the latter sense of Desvaugh by such authors as Persoon (1807), Grisebach (1859), Britton and Millspaugh (1920), and Barker and Dardeau (1930).

Chromosome numbers are known ($n = 17$) for three species: *P. umbellata* (Skovsted, 1935; Webber, 1936; Bates, pers. comm.); *P. abutiloides* (Webber, 1936); and *P. rosea* (Bates and Blanchard, 1970).

The same chromosome number is found in the related *Malacothamnus*, but does not occur elsewhere in the tribe Malveae (Bates, 1968). *Il-*

amna, the third member of the *Malacothamnus* alliance, has $n = 33$, a number most easily interpreted as a polyploid derivative ($2n - 1$) of a 17-chromosome ancestor, as suggested by Wiggins (1936).

Chaudhuri (1965) described and illustrated the pollen grains of *P. abutiloides* (as *Sphaeralcea abutiloides*), but unfortunately did not cite a voucher specimen. The pollen is reported to be tricolporate, which is a character relatively less advanced than the panaperturate condition found in some other genera of the Malvaceae. Pentacolporate pollen grains characterize *P. rosea* and *P. umbellata* (Elsik & Fryxell, unpublished).

PHYMOSIA Desvaux ex Hamilton, Prodr. Pl. Ind. Occid. 49. 1825. *Malva* section *Sphaeroma* DC. Prodr. 1:435. 1824. *Sphaeralcea* St. Hil. Fl. Bras. Mer. 1:209. 1827, emend. G. Don, Gen. Hist. 1:465. 1831, pro parte. *Sphaeroma* (DC.) Schlecht. Linnaea 11:352. 1837, non Harv. 1866. *Meliphlea* Zucc. Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 2:359. 1837. *Sphaeralcea* sect. *Meliphlea* (Zucc.) Bak. f. J. Bot. 31:367. 1893. *Sphaeralcea* subgen. *Meliphlea* (Zucc.) Kearn. Univ. Calif. Publ. Bot. 19:2. 1935. *Sphaeralcea* subgen. *Phymosia* (Desv. ex Hamilt.) Kearn. Univ. Calif. Publ. Bot. 19:2. 1935.

D. M. Bates (pers. comm.) pointed out the need to designate a lectotype species of section *Sphaeroma* and provided helpful discussion of the nomenclatural considerations involved in the choice. *Malva rosea* DC. is herewith designated as lectotype species of *Malva* section *Sphaeroma* DC. and hence of the genus *Sphaeroma* (DC.) Schlecht.

Type species. *Phymosia abutiloides* (L.) Desv. ex Hamilt.

Shrubs or small trees of neotropical distribution, usually densely invested with stellate tomentum on stems, petioles, and peduncles, the hairs often stipitate and more or less fufureous. Leaves aceriform, cordate, 3–7 lobed (often merely pentagonal), the central lobe predominant, obtuse to acuminate, 5–9 nerved, crenate or crenulate (rarely subentire) or dentate. Petioles half length of lamina to equaling lamina. Stipules subulate, persistent (?). Peduncles solitary in the axils, 1-many flowered, usually exceeding the subtending leaf, the branch sometimes forming a terminal paniculate inflorescence. Involucre trimerous, of 3 distinct involucrel bractlets, or forming a gamophyllous tube, sometimes caducous. Calyx gamosepalous, 5-lobed, plicate in bud, tomentose without; inner surface of calyx divided into two regions: the proximal region made up of the calyx tube and the central portion of each lobe, which is glabrous, and the distal region made up of the margin of each lobe (where plicate in bud) which is densely matted with fine hairs. Bractlets of individual flower (when distinct) often positioned asymmetrically, so that the bractlets of the inflorescence (often umbellate) tend to be on the periphery of the umbel. Petals asymmetrically obovate, obtuse or shallowly bifid, glabrous except on claw where densely but locally pubescent (except glabrous throughout in *P. rosea*). Staminal column glab-

rous, pallid, narrowly columnar, abundantly antheriferous on upper portion (or anthers petaloid in certain double-flowered cultigens); anther mass globose to elongate; pollen yellow or orange, spheroidal, echinate. Styles numerous, as many as the carpels (10–20 in the smaller-fruited species, 30–40 in the larger-fruited), distinct where exerted from the androecium, at first glabrous, but often revealing ascending-strigose hairs when fully elongated, at length recurved; stigmas capitate in the smaller-flowered species (sometimes obliquely so) to unilaterally decurrent in the larger-flowered species. Flowers evidently protandrous, the styles emerging from within the staminal column only after anther dehiscence. Fruits globose to obovate, yellowish-tomentose; mericarps numerous (as many as the styles), reniform or oblong, thin, dehiscent to the base, smooth, shedding from a central column at maturity, few-seeded. Seeds reniform, glabrous. Chromosome number $n = 17$.

KEY TO THE SPECIES OF PHYMOSIA

Inflorescence an axillary panicle, many-flowered; involucre bractlets 4–7 mm long, 1–2 mm wide, caducous; calyx 8–10 mm long, petals lavender or pink, 18–22 mm long.

Bractlets 6–7 mm long, 1 mm wide, linear; calyx lobes as long as broad.

1. *P. abutiloides*

Bractlets 4–5 mm long, 1½–2 mm wide, lanceolate; calyx lobes longer than broad 1. *P. floribunda*

Inflorescence an axillary umbel, 1–4 flowered; involucre bractlets 6–30 mm long, lanceolate, ovate, or spatulate, or sometimes forming a gamophyllous tube, caducous or persistent; calyx 10–40 mm long; petals white to burgundy, 20–70 mm long.

Calyx 10–14 mm long; bractlets 6–14 mm long, caducous; flowers lavender.

Peduncles usually uniflorate; involucre bractlets 6–8 mm wide, enclosing bud, ovate-sessile 3. *P. crenulata*

Peduncles 2–3 flowered; involucre bractlets 1–4 mm wide, lanceolate.

4. *P. pauciflora*

Calyx 15–40 mm long; bractlets 10–30 mm long, caducous or persistent; flowers white to burgundy (including pink, rose, red, etc).

Calyx 15–20 mm long; petals 20–35 mm long; bractlets stipitate or sessile, usually persistent; claw of petal ciliate; filaments 2–3 mm long.

Bractlets stipitate-spatulate; peduncles usually triflorate; petals burgundy.

5. *P. umbellata*

Bractlets ovate-sessile; peduncles usually uniflorate; petals rose; flowers (in cultivation sometimes double 6. *P. anomala*

Calyx 25–40 mm long; petals 35–70 mm long; bractlets sessile or forming gamophyllous tube, caducous or persistent; claw of petal glabrous or ciliate; filaments 3–6 mm long.

Petals glabrous on claw, white to rose-red; bractlets ovate or forming a gamophyllous tube, often caducous at anthesis; filaments ca. 3 mm long.

7. *P. rosea*

Petals ciliate on claw, deep burgundy; bractlets lanceolate, distinct, persistent; filaments 5–6 mm long 8. *P. rzedowskii*

1. *PHYMOSIA ABUTILOIDES* (L.) Desvaux ex Hamilton, Prodr. Pl. Ind. Occid. 49. 1825. *Malva abutiloides* L. Sp. Pl. (ed. ii), 971. 1763, non L.

f., 1781. [Type: Dill. Hort. Elth. t. 1, f. 1.] *Sphaeralcea abutiloides* (L.) G. Don, Gen. Syst. 1:465. 1831. *Abutilon Eggersii* Bak. f. J. Bot. 31:75. 1893. [Type: *Eggers 4288* (BM-seen as photo, US).]

Shrub to ca. 3 m tall. Twigs densely pallid-tomentose, the hairs stellate, $\frac{1}{2}$ – $\frac{3}{4}$ mm diameter, 10–20 armed, sometimes stipitate. Leaves up to 13 cm long, cordate, commonly 5-lobed, the larger leaves 7- or even 9-lobed (the central lobe the largest and triangular), acute, 7–9 nerved, densely stellate tomentose below, moderately so above, discolorous; leaf margin dentate, the teeth about as long as wide, rather closely spaced (3–4 per cm), acute or somewhat rounded, clearly differentiated. Petioles densely tomentose (canescent), $\frac{1}{2}$ – $\frac{2}{3}$ length of lamina. Stipules tomentose, 5–10 mm long. Peduncles yellowish-tomentose, branched and paniculately multiflorate, the branch forming compound terminal panicles. Involucre of three distinct bractlets inserted at base of calyx; bractlets 6–7 mm long, 1 mm wide, linear, pubescent, caduous in fruit. Calyx 8–10 mm long, densely tomentose; lobes 3 mm wide at base, 3 mm long, triangular, acute, 3-ribbed. Petals 18–22 mm long, glabrous (except densely pubescent on margins of claw), lavender (pink?), often apically bifid. Staminal column narrow ($\frac{1}{2}$ mm diameter), shorter than the petals, antheriferous in upper two-thirds; filaments 1 mm long, numerous; anther mass elongate; pollen yellowish. Styles as many as the carpels (15–20), at first glabrous but revealing strigose hairs when fully elongated; stigmas glabrous, capitate. Fruit 1 cm diameter, globular or slightly obovoid; mericarps 15–20, reniform, 8–11 mm long. Seeds 2 mm long. Chromosome number, $n = 17$. Figs. 1, 9.

Specimens examined. HAITI: Gros Cheval, *Holdridge 1704* (GH, MICH, MO, US); Massif de la Pelle, Groix des Bouquets, Badeau, *Ekman 7723* (F, US). BAHAMAS: *Brace 103* (MO), *104* (MO), *105* (F), *106* (F), *136* (MO); Grand Bahama: Hawk's Bill Creek, *Howe 2554* (F), Eight Mile Rocks, *Brace 3698* (F); New Providence: *Brace 484* (GH), Blue Hills, *Millsbaugh 2475* (F), Blue Ridge, *O'Neill 8212* (MICH), Seven Hills, *Eggers 4288* (US) *E. G. Britton 6591* (F), Coppici, *Britton & Brace 414* (F), Abaco, Cherokee Sound, *Brace 1929* (F, US); Eleuthera: Harbor Island to Upper Bogue, *E. G. Britton 6471* (F). In cultivation: *Dillenius* s.n. (OXF).

Phymosia abutiloides occurs near sea level in the Bahamas to elevations as high as 1500 m in Haiti. Although cultivated for its profuse flowers (at least in Europe, where it was introduced, see Table 1), it apparently has received no vernacular names.

2. ***Phymosia floribunda*** (Schlecht.) Fryxell, comb. nov. *Sphaeroma floribundum* Schlecht. Linnaea 11:353. 1827. [Type: Oaxaca, *Mühlenpfordt* s.n. (B-destroyed). Neotype: Oaxaca: Yavesía, *Galeotti 4088* (BR).] *Sphaeralcea floribunda* (Schlecht.) Walp. Rep. 2:789. 1843, non Philippi, 1864.

TABLE 2. SUMMARY OF DISTINGUISHING CHARACTERS OF SPECIES OF PHYMOSIA.

Species	Type of inflorescence	Flower size*	Flower color	Bracteole form	Leaf size*	Leaf margin**	Fruit size*	Distribution
<i>abutiloides</i>	axillary panicle	small	lavender	linear	large	dentate	small	Caribbean
<i>floribunda</i>	axillary panicle	small	lavender	lanceolate	small	crenate	small	isthmian Mexico
<i>crenulata</i>	flowers solitary in axils	medium	lavender	ovate	small	crenate	isthmian Mexico
<i>pauciflora</i>	axillary umbel	medium	lavender	lanceolate	small	crenate	small	eastern Mexico
<i>umbellata</i>	axillary umbel	medium	burgundy	stipitate	large	subentire	moderately large	eastern Mexico
<i>anomala</i>	flowers solitary	medium	rose	ovate	small	crenate	eastern Mexico
<i>rosea</i>	axillary umbel	large	rose or white	often gamophyllous	large	dentate	large	western Mexico, Guatemala
<i>rzedowskii</i>	axillary umbel	large	burgundy	lanceolate	large	crenate	large	western Mexico

*See actual descriptions for exact size measurements.

**See Figs. 1-8 for better evaluation of leaf margin descriptions.

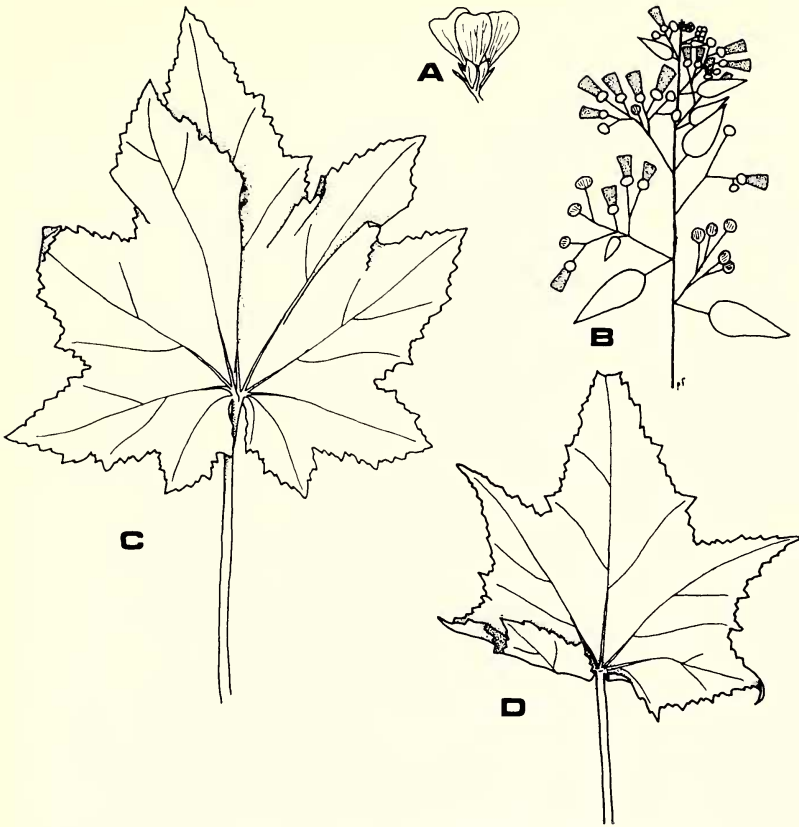


FIG. 1. *Phymosia abutiloides*: A, flower (Holdridge 1704), $\times \frac{1}{2}$; B, inflorescence diagram (Holdridge 1704), $\frac{1}{4}$; C, leaf (Holdridge 1704), $\times \frac{1}{2}$ D, leaf (Millspaugh 2476), $\times \frac{1}{2}$.

Shrub. Twigs densely yellowish-tomentose becoming moderately so; the hairs stellate, $\frac{1}{2}$ -1 mm diameter, 10-15 armed. Leaves up to 9 cm long, ovate to weakly 3-5 (rarely 7-) lobed, the central lobe predominant, shallowly cordate, acute, usually 7-nerved, densely stellate tomentose below, moderately to sparsely so above; leaf margins crenate, the teeth usually 1 mm long, 2 mm wide, closely spaced (4-4 $\frac{1}{2}$ per cm), rounded, well differentiated. Petioles densely tomentose, ca. $\frac{1}{3}$ length of lamina. Stipules 6-9 mm long, sparsely tomentose. Peduncles yellowish-tomentose, branched and paniculately multiflorate, the branch forming compound terminal panicles. Involucre of three distinct bractlets inserted at base of calyx or (often irregularly so) just below calyx on pedicel; bractlets, 4-5 mm long, 1 $\frac{1}{2}$ -2 mm wide (broadest in middle), lanceolate, moderately tomentose, often caducous. Calyx 7-10 mm long, tomentose; lobes 3 mm wide at base, 5 mm long, triangular, acute, obscurely 3-ribbed. Petals 18-20 mm long, glabrous (except densely

TABLE 3. A COMPARISON OF THREE SPECIES OF PHYMOSIA.

Character	<i>crenulata</i>	<i>anomala</i>	<i>umbellata</i>
Diam. of stellate hairs	1 mm or more	$\frac{1}{2}$ – $\frac{3}{4}$ mm	$\frac{1}{2}$ –1 mm
No. arms of stellate hairs	5–10	10–20	10–15
Leaf length	up to 5 cm	up to 9 cm	up to 9 cm
Leaf margin	crenate	crenate	subentire
Petiole length (relative to lamina)	$\frac{1}{2}$ –1	$\frac{1}{3}$ – $\frac{2}{3}$	$\frac{1}{2}$ –1
Inflorescence	uniflorate	uniflorate (rarely paired)	umbellate
Bract form	ovate-sessile	ovate-sessile	stipitate-spatulate
Bract width	6–8 mm	9–12 mm	4–8 mm
Calyx length	10–12 mm	16–22 mm	15–20 mm
Petal color	lavender	rose	burgundy
Petal length	2–3 cm	3–4 cm	2–3½ cm
Filament length	ca. 1 mm	2–3 mm (or petaloid)	ca. 3 mm
Style no.	ca. 20	25–30	30–35
Distributor	Puebla	Hidalgo (and cult.)	Tamaulipas to Puebla

pubescent on margins of claw), lavender. Staminal column narrow ($\frac{2}{3}$ mm diameter), shorter than the petals (ca. 1 cm long), antheriferous in upper half; filaments 1–1½ mm long, numerous; anther mass somewhat elongate. Styles as many as the carpels (10–15), glabrous; stigmas glabrous, capitate. Fruit globular, 8 mm diameter; mericarps 10–15, reniform, 8 mm long. Seeds 2 mm long. Figs. 2, 9.

Specimens examined. MEXICO: Oaxaca: Yavesía, 6500 feet alt., *Galeotti 4088* (BR-3 sheets).

The type of *P. floribunda* (*Mühlenpfordt*, s.n.) is not among the holdings of the Halle herbarium. Presumably it was kept in Berlin and is now lost. No duplicates of Mühlenpfordt's specimen have yet been located in other herbaria. Schlechtendal's description, however, is ample and matches well the specimen of Galeotti, cited above, on which the preceding description is based. In view of the unlikelihood of discovering additional material of Mühlenpfordt's collection (isotypes), the designation of Galeotti's specimen as neotype is regarded as a satisfactory typification of this name. This view is reinforced by the knowledge that Mühlenpfordt resided in Yavesía for the two years that he was in Mexico while employed at the mining operations in the Ixtepeji region of Oaxaca (Mühlenpfordt, 1839). Since he complained of his inability to visit other parts of Mexico (except for his trip to the Pacific coast, February 2–March 10, 1829), it seems probable that his collection of *P. floribunda* was made in the general vicinity of his residence in Ya-

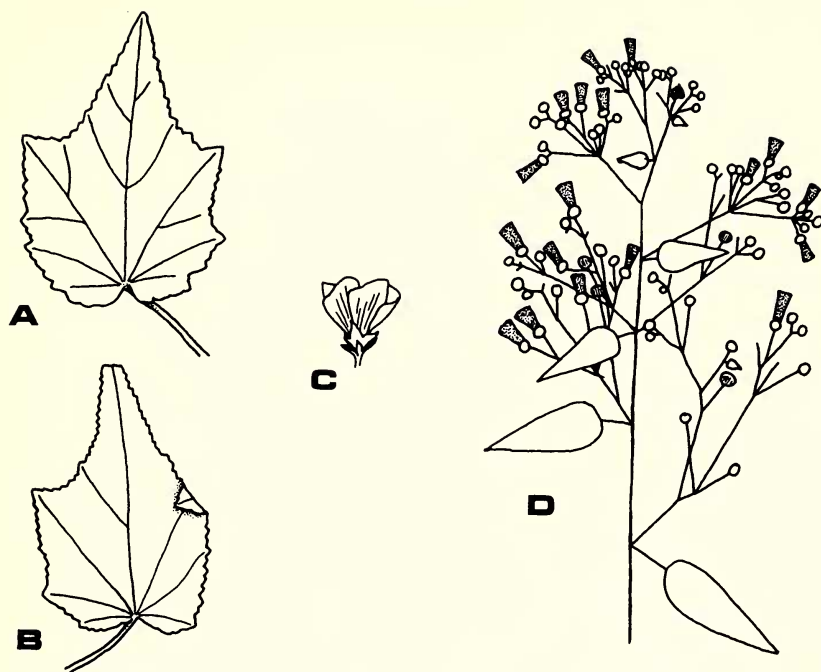


FIG. 2. *Phymosia floribunda*: A-B, leaves (Galeotti 4088), $\times \frac{1}{2}$; C, flower (Galeotti 4088), $\times \frac{1}{2}$; D, inflorescence diagram (Galeotti 4088), $\times \frac{1}{4}$.

vesia. The neotype, thus, is from the type locality—and indeed from the only known locality for this species.

Phymosia floribunda is closely allied to *P. abutiloides*, as these two species are the only paniculate-flowered representatives of *Phymosia*. They may be distinguished not only geographically but in several morphological characters as well. *Phymosia floribunda* occurs in north-central Oaxaca rather than in the Caribbean, and at relatively higher elevation (ca. 2000 m) than *P. abutiloides*. Yavesía, the type locality, is approximately 40 km NE of the city of Oaxaca.

Phymosia floribunda appears to have excellent potential as an ornamental shrub, because of the large amount of flowers produced on its abundant panicles. Efforts should be made to recollect this species and bring it into cultivation.

3. *Phymosia crenulata* (Brandg.) Fryxell, comb. nov. *Sphaeralcea crenulata* Brandg. Univ. Calif. Publ. Bot. 3:384. 1909. [Type: MEXICO: Puebla: Barranca Cerro de Paxtle, *Purpus* 2601 (UC).]

Shrub. Twigs densely yellowish-tomentose becoming glabrate in age; the hairs stellate, 1 mm in diameter or more, 5–10 armed. Leaves up to 5 cm long, about as wide, cordate, 3–5 lobed (or sometimes simply pentagonal), the central lobe the largest, obtuse or sometimes acute, 5–7

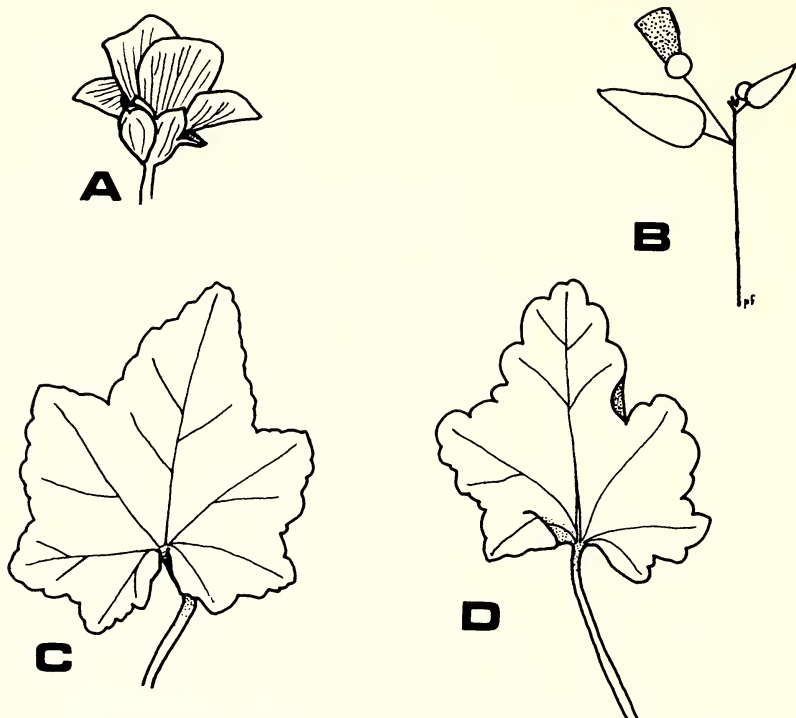


FIG. 3. *Phymosia crenulata*: A, flower (*Purpus 2601a*), $\times \frac{1}{2}$; B, inflorescence diagram (*Purpus 2601a*), $\times \frac{1}{4}$; C, leaf (*Purpus 2601a*), $\times \frac{1}{2}$; D, leaf (*Purpus 2601*), $\times \frac{1}{2}$.

nerved, moderately tomentose below, sparsely so above, the stellate hairs of the upper surface often with a reduced number of arms; leaf margins coarsely crenate, the teeth rounded or rarely acutish and clearly differentiated, usually 3–4 mm wide (less commonly 2–5 mm wide), 1–2 mm long. Petioles densely yellowish-tomentose, $\frac{1}{2}$ length of lamina to equaling lamina. Stipules 4–9 mm long, sparsely to moderately tomentose (in contrast to adjacent stem and petiole which are densely so). Peduncles $1\frac{1}{2}$ –4 cm long, densely yellowish-tomentose, usually (always?) uniflorate, the branch sometimes forming a short terminal raceme; pedicel 1 cm or less. Involucre of 3 bractlets inserted at base of calyx, densely yellowish-tomentose, mostly enclosing bud; bractlets 10–14 mm long, 6–8 mm wide, broadly ovate to lanceolate, sessile, caducous at anthesis. Calyx 10–12 mm long, densely yellowish-tomentose; lobes 4–5 mm wide at base, 6–7 mm long, rounded and slightly apiculate, 3-nerved. Petals 2–3 cm long, glabrous except pubescent at very base of claw where joined to the androecial column, lavender. Staminal column ca. 1 cm long; filaments very short (often < 1 mm); pollen yellow-orange. Styles several (ca. 20); stigmas asymmetrically capitate rather than decurrent,

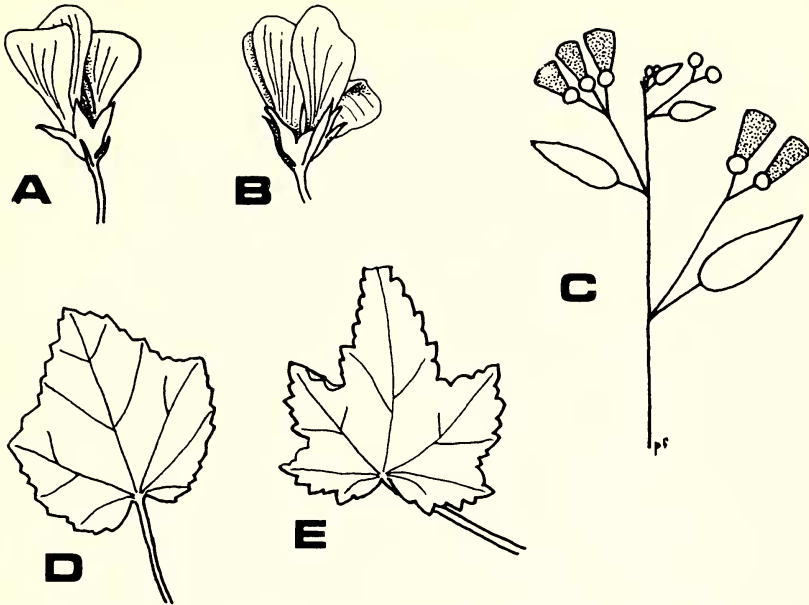


FIG. 4. *Phymosia pauciflora*: A, flower (Coulter 800), $\times \frac{1}{2}$; B, flower (Stanford, et al. 836), $\times \frac{1}{2}$; C, inflorescence diagram (Stanford, et al. 836), $\times \frac{1}{4}$; D, leaf (Coulter 800), $\times \frac{1}{2}$; E, leaf (Stanford, et al. 836), $\times \frac{1}{2}$.

pallid. Fruits unknown. Figs. 3, 9.

Specimens examined. MEXICO: Puebla: Barranca Cerro de Paxtle, *Purpus* 2601 (UC), vicinity of San Luis Tultitlanapa (near Oaxaca), *Purpus* 2601a (GH, MO).

Phymosia crenulata is poorly known. The two specimens cited were collected from the state of Puebla, Mexico, both in the near vicinity of Tehuacán (Sousa 1969).

4. *Phymosia pauciflora* (Bak. f.) Fryxell, comb. nov. *Sphaeralcea floribunda* (Schlecht.) Walp. var. *pauciflora* Bak. f. J. Bot. 31:365. 1893. [Type: MEXICO: Hidalgo: Zimapan, Coulter 800.]

Presumably a shrub; flowering branches slender, densely stellate-pubescent on young growth, sparsely pubescent on older twigs. Leaves 4–7 cm long, about as broad, stellate-pubescent, more densely so below than above, cordate, palmately 7-nerved, crenate or dentate, shallowly 3-lobed to moderately 5-lobed (and aceriform), acute. Petiole stellate-pubescent, $\frac{1}{2}$ – $\frac{2}{3}$ length of lamina. Stipules 4–8 mm long, less than 1 mm broad, sparsely pubescent. Inflorescence a 1–3 flowered axillary umbel; peduncles 3–5 cm long; pedicels 1–2 cm long, stellate-pubescent; each flower subtended by 3 distinct involucreal bracteoles that are caducous shortly after anthesis; bracteoles 6–11 mm long, 1–4 mm broad, somewhat irregularly inserted below calyx tube, lanceolate, moderately pubescent. Calyx densely pubescent, 10–14 mm long; lobes

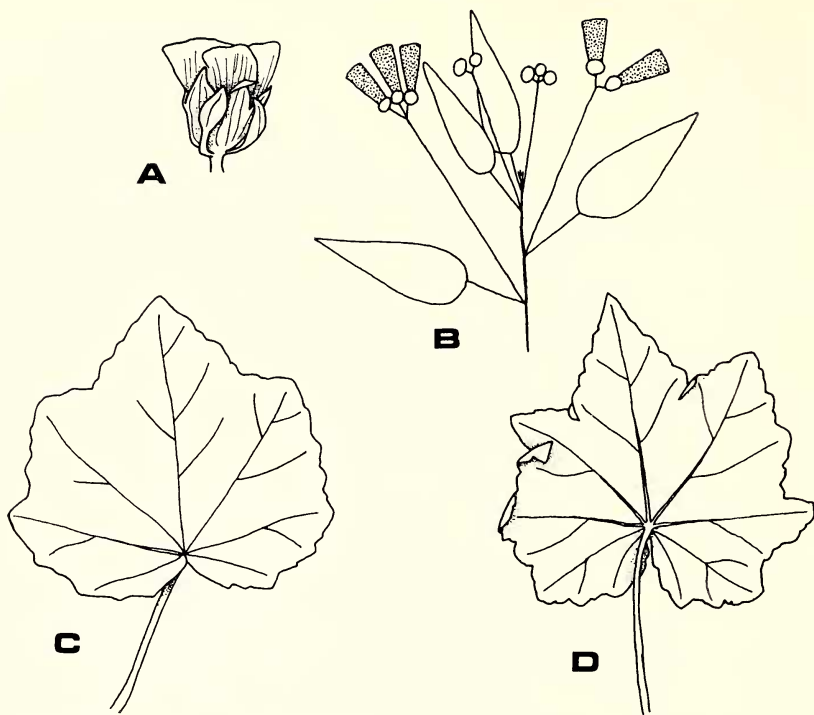


FIG. 5. *Phymosia umbellata*: A, flower, $\times \frac{1}{2}$; B, inflorescence diagram (Pringle 6241), $\times \frac{1}{4}$; C, leaf (Pringle 6241) $\times \frac{1}{2}$; D, leaf (Sessé & Mociño s.n.), $\times \frac{1}{2}$.

weakly costate, acute or slightly acuminate. Petals 2–3 cm long, $1\frac{1}{2}$ cm wide, apically notched, obovate and gradually narrowed below, glabrous except densely pubescent on margin of claw, lavender. Staminal column 7–9 mm long, antheriferous on upper part of column; filaments 1–2 mm long. Styles 12–16, glabrous; stigmas capitate (often obliquely so). Fruit oblate, 8–11 mm long, 12–14 mm diameter; mericarps reniform, stellate-pubescent. Figs. 4, 9.

Specimens examined. MEXICO: Hidalgo: Zimapan, Coulter 800 (GH, K [as photo, F]); Tamaulipas: in hills 19 km SE of Miquihuana on road to Palmillas in narrow, deep and moist arroyo. Fls. orchid. Elevation 2250 m. Latitude $23^{\circ}40' N$, $99^{\circ}41' W$, L. R. Stanjord, K. L. Retherford, & R. D. Northcraft 836, 11 Aug 1941 (ARIZ, GH, MO).

The two specimens cited above differ appreciably in leaf form, those of 836 being clearly aceriform, while those of 800 are only shallowly lobed. The bracteoles of 800 are also somewhat shorter than those of 836. In other respects the two are similar.

Number 836 (MO-1221254) bears a manuscript name of a new species in *Sphaeralcea* by I. M. Johnston, but this name was never published to my knowledge.

5. *PHYMOSIA UMBELLATA* (Cav.) Kearn. Leaf. West. Bot. 5:190. 1949. *Malva umbellata* Cav. Icones 1:64, t. 95. 1791, non Bert., 1829. [Type: *Sessé & Moçino* s.n. (MA-2 sheets, seen as photo, MO).] *Sphaeralcea umbellata*. (Cav.) G. Don, Gen. Syst. 1:465. 1831. *Sphaeralcea galeottii* Turcz. Bull. Soc. Nat. Mosc. 31:186. 1858. [Type: Veracruz: Tlachichuca, al pie del Volcán, *Galeotti 4102* (BR-3 sheets).]

Shrub or tree 2–6 m high. Twigs densely yellowish-tomentose, or sometimes sparsely so; the hairs stellate, $\frac{1}{2}$ –1 mm diameter, 10–15 armed, often stipitate. Leaves up to 9 cm long (14 cm in *Steyermark 31715*), cordate, 5 (–7) angled or shallowly lobed, acute, 7–9 nerved, densely to moderately tomentose below (rarely glabrate), sparsely tomentose to glabrate above; leaf margins coarsely and shallowly crenate, sometimes undulate to subentire, the teeth typically much broader than long, widely spaced (1–2½ per cm), acute to rounded, often not clearly differentiated. Petioles tomentose, $\frac{1}{2}$ length of lamina to equaling lamina. Stipules tomentose, 4–7 mm long. Peduncles 4–13 cm long, sometimes branching below the articulation of the pedicels, yellowish-tomentose, 1–4 (commonly 3-) flowered, umbellate; pedicels $\frac{1}{2}$ –2 cm long. Involucre of 3 distinct bractlets inserted at the base of the calyx; bractlets 1–2 cm long, 4–8 mm wide, spatulate, abruptly narrowed below to form a clearly defined stipe (or rarely sessile and lanceolate), moderately pubescent to glabrate without, usually persistent. Calyx $1\frac{1}{2}$ –2 cm long, densely yellow-tomentose; lobes 6–8 mm wide at base, 6–15 mm long, triangular to ovate, acute, 3-ribbed. Petals 2–3½ cm long, glabrous except ciliate on margin of claw, burgundy or rarely paler. Staminal column narrow (2 mm diameter), shorter than the petals, antheriferous only in upper half; filaments ca. 3 mm long, numerous; anther mass subglobose or somewhat elongated; pollen yellow or orange. Styles numerous (30–35), ascending strigose below; stigmas unilaterally decurrent or obliquely capitate. Fruit obovate, 2–2½ cm diameter; mericarps 30–35, reniform, 8–17 mm long. Seeds 3 mm long. Chromosome number, $n = 17$. Figs. 5, 9.

Specimens examined. MEXICO: without locality: *Sessé & Moçino* s.n. (MA-2 sheets, seen as photo, MO); Tamaulipas: Las Yucas, ca. 40 km NNW of Aldama, *Dressler 1903* (GH, MICH, MO), 10 miles SSW of Ciudad Victoria, *Moran 10039* (UC); Veracruz: Atoyac, *E. Kerber 150* (BR, US), Tlachichuca, *Galeotti 4102* (BR, P-as photo), near Jalapa, *Fryxell 619* (CTES, NY, TAES), cerca de los Baños de Carrizal (=Emiliano Zapata) entre Jalapa y Veracruz, *Paray 2899* (ENCB); San Luis Potosí: 15 km E of Rayón, *Rzedowski 24494* (ENCB, MICH), Tamasopo Canyon, *Pringle 3965* (BR, DS, ENCB, F, GH, MICH, UC, US), *3609* (GH), *Puig 3646* (ENCB), 15–20 km W of Ciudad Valles, *Lukefahr* s.n. 14 Oct 1967 (TAES), near Ciudad del Maiz, *C. & E. Seler 783* (GH); Hidalgo: Zimapan, *Coulter 801* (GH), SW of Tama-zunchale (SLP) near state line, *Fryxell 697* (TAES), 20 mi NE of

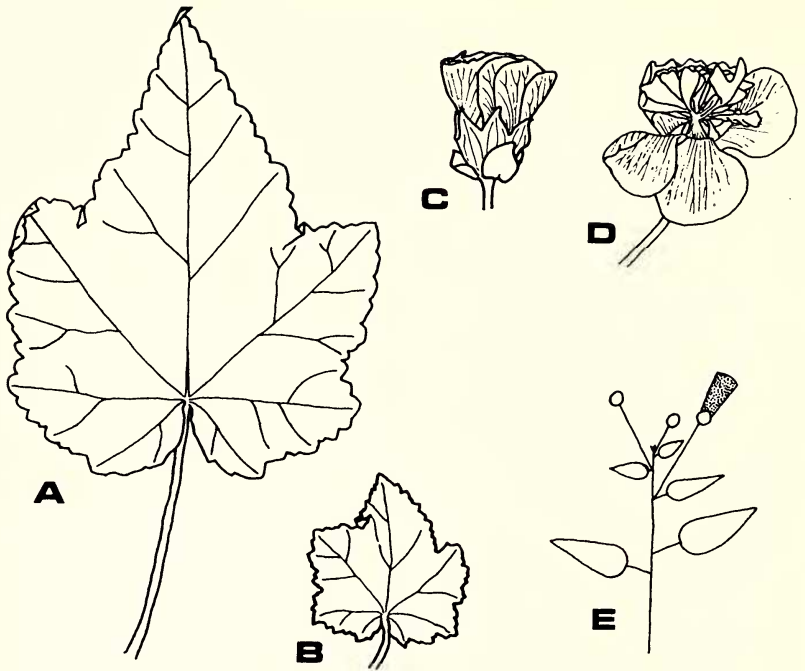


FIG. 6. *Phymosia anomala*: A, leaf (Bates, Blanchard & Fryxell 1636), $\times \frac{1}{2}$; B, leaf (Martínez 15054), $\times \frac{1}{2}$; C, flower (Martínez 16054), $\times \frac{1}{2}$; D, flower (showing petaloid stamens of double flower) (Bates, Blanchard, & Fryxell 1636), $\times \frac{1}{2}$; E, inflorescence diagram (Bates, Blanchard & Fryxell 1636), $\times \frac{1}{4}$.

Jacala, Fryxell 1070 (DS, F, GH, MICH), S of Jacala, Carlson 2800 (F), near Zacualtipan, Moore 5411 (GH, UC); Puebla: near Tehuacán, Rose & Hay 5945 (GH, US) Rose, Painter & Rose 11244 (GH, US) Pringle 6241 (BR, ENCB, F, GH, MICH, MO, UC, US) Conzatti 2197 (F, GH) Liebmann 1205 (US) Fryxell & Bates 920 (BH, OXF), vicinity of Puebla, Arsène 7108 (US) 7101 (US) C. & E. Seler 834 (ENCB, GH, US); Distrito Federal: Chapultepec [cult.?], Paray 236 (ENCB). GUATEMALA: Dept. Chiquimula: montaña Nonja, Steyermark 31715 (F). In cultivation: Europe, May 1872 (US-11779), Riverside, California, Kearney 210 (US).

Kearney's specimen, cultivated at Riverside, California, is evidently the voucher specimen for Webber's (1936) chromosome count of this species.

The distribution of *P. umbellata* is primarily along the eastern slopes of central Mexico, except for one anomalous specimen from Guatemala. The altitudinal range of *P. umbellata*, 800–2100 m altitude, is lower than that of *P. anomala* or *P. rosea*.

6. *Phymosia anomala* Fryxell, spec. nov. Frutex 3–4 m altus. Ramunculi dense stramini-tomentosi, pilis stellatis $\frac{1}{2}$ – $\frac{3}{4}$ mm diam., 10–20 ramosis, saepe stipitatis. Folia usque ad 4 cm longa, circa quam latiora, cordata, 3–5-lobata vel angulata, acuta, 7-nervata, stellato-tomentosa infra, sparse stellato-tomentosa supra; margines foliorum crenati, dentibus latioribus quam longioribus, arcte dispositis (ca. 6 in quoque cm), rotundatis, aliquantim vel valde distinguilibus inter se. Petioli dense tomentosi (canescentes), circa $\frac{1}{3}$ longiores quam laminae. Stipulae tomentosae, 4 mm longae, subulatae. Pedunculi stramini-tomentosi, axillares, uniflorentes, usque ad 5 cm longi, incrassati apicem versus, prope centrum bracteola parvula (1–2 mm). Involucra trimera, ad basem calycum inserta; bracteolae involucrorum late ovatae, aliquantum imbricatae, 10–13 mm longae, 9–12 mm latae, sessiles, acutae, sparse tomentosae, per anthesin persistentes. Calyces 16–20 mm longi, dense tomentosi; lobi calycum 6–7 mm lati ad basem, 6–8 mm longi, ovati-acuminati, 3-nervati. Petala 3–3 $\frac{1}{2}$ cm longa, praeter in unguibus longis ciliatis (pilis 1–2 mm) glabra, rosea vel vinosa in sicca. Columna staminalis quam petala brevior, 2 mm diam., antherifera in dimidio supero; fila 2–3 mm longa, numerosa (in floribus duplicibus excepto, in quibus petaloideis); cumulus antherarum subglobosus; pollen flavum. Styli numerosi (25–30), saltem apicem versus glabri; stigmata secundatim decurrentia vel oblique capitata. Fructus ignotus. Fig. 6.

Holotype. MEXICO: Hidalgo: Real del Monte, *M. Martínez* 15054, Aug 1946 (MO-1313132).

Many of the characters of *Phymosia anomala* recombine or are intermediate between those of *P. crenulata* and *P. umbellata*. I have therefore prepared a detailed comparison of these three species in Table 3.

The type locality, Real del Monte, is about 10 km northeast of Pachuca, Hidalgo, at an elevation of about 2600 meters. For reasons best known to cartographers, this locality appears on most maps as Mineral del Monte. The collection site of the type specimen, a single-flowered plant with normal (not petaloid) stamens, is not known with exactness. I have, however, collected a double-flowered specimen of this species (1672), growing as a houseyard cultigen, in the city of Real del Monte. The same double-flowered cultigen has been collected in Pátzcuaro, Michoacán (1636), and has been observed (though not collected) in Los Lirios, Coahuila (east of Saltillo). Doubtless, it is widely distributed in cultivation, but curiously has not otherwise been found among the herbarium collections that I have studied.

The double-flowered cultigen produces no fruits and hence must be propagated vegetatively. It has evidently been distributed widely by this means, even beyond the known range of the genus (to Coahuila). It is not possible to say much about the natural distribution of the species, however, or about the origin of the cultivar, since the single-flowered form is known only from a single specimen. The altitudinal range appears to be approximately 2000–2600 meters.

Specimens examined. MEXICO: Hidalgo, Real del Monte, *Martínez 15054* (MO), *Bates, Blanchard & Fryxell 1672* (BH, CTES, MEXU, NA); Michoacán: Pátzcuaro, in houseyard, *Bates, Blanchard, & Fryxell 1636* (BH, CTES, ENCB).

7. PHYMOSIA ROSEA (DC). Kearn. Leafl. W. Bot. 5:190. 1949. *Malva rosea* DC. Prodr. 1:435. 1824. [Type: Calque des Dessins de la Flore du Mexique de Moçño et Sessé . . ., No. 58 (F, G, US).] *Sphaeroma roseum* (DC). Schlecht. Linnaea 11:352. 1837. *Malvastrum roseum* (DC). Hemsl. Biol. Centr. Amer. Bot. 1:100. 1879. *Sphaeralcea umbellata* var. *rosea* (DC.) Bak. f. J. Bot. 31:367. 1893. *Sphaeralcea rosea* (DC.) Standl. Contr. U.S. Natl. Herb. 23:767. 1923. *Meliphlea vitifolia* Zucc. Abh. Math.—Phys. Cl. Königl. Bayer. Akad. Wiss. 2:360. 1837. [Type: in *caldariis*, *Zuccarini* s.n. (BR-3 sheets, M-5 sheets, seen as photo).] *Sphaeralcea vitifolia* (Zucc.) Benth. & Hook. ex Hemsl. Biol. Centr. Amer. Bot. 1:114. 1879. *Sphaeroma vitifolium* (Zucc.) Kuntze, Rev. Gen. Pl. 1:74. 1891. *Sphaeralcea nutans* Scheidw. ex Planch. in Fl. des Serres 7:221. 1851–2. [Type: Planchon, loc. cit., t. 726.] *Sphaeroma nutans* (Scheidw.) Kuntze, Rev. Gen. Pl. 1:74. 1891. *Sphaeralcea schenckii* Ulbr. Notizbl. Bot. Gart. Berlin-Dahlem 11:523. 1932. [Type: *Schenck 97* (B-probably lost).]

Shrub or small tree, $1\frac{1}{2}$ –10 m high. Twigs densely (rarely sparsely) tomentose; the hairs stellate, $\frac{1}{4}$ –1 mm diameter, 10–35 armed, pallid to yellowish, often stipitate. Leaves up to 14 cm long, cordate, crenate, 3–7 (usually 5-) lobed (the central lobe the largest), acuminate, 7–9 nerved, densely tomentose below (hairs stellate), sparsely so above (hairs sometimes simple and more or less distally oriented) or sometimes glabrate above; leaf margins clearly and distinctly crenate or dentate, the teeth about as broad as long, closely spaced (4–5 per cm), acute to rounded, clearly differentiated. Petioles densely tomentose (sometimes sparsely so), pallid or yellowish, $\frac{1}{2}$ length of lamina to equaling lamina. Stipules sparsely to moderately tomentose, 6–13 mm long. Peduncles 4–17 cm long, sometimes branching below the articulation of the pedicels, yellowish-tomentose, 1–3 flowered, umbellate, the branch sometimes forming few-flowered terminal panicles. Involucre $1\frac{1}{2}$ – $2\frac{1}{2}$ cm long, inserted at base of calyx, sometimes enclosing bud as a gamophyllous tube, sometimes of 3 distinct, cuneate, broadly lanceolate bractlets 1–2 cm wide, moderately tomentose to glabrate, the persisting stellate hairs often reduced; involucre often caducous at anthesis. Calyx $2\frac{1}{2}$ –4 cm long, splitting in fruit, densely yellow-puberulent; lobes 8–15 mm wide at base, 2 – $2\frac{1}{2}$ cm long (rarely shorter), triangular, acute or acuminate, 3–5 ribbed. Petals $3\frac{1}{2}$ –7 cm long, glabrous even at base of claw, rose or white. Staminal column narrow (2–3 mm diameter), usually shorter than the petals but sometimes exserted, antheriferous only in upper half; filaments ca. 3 mm long; anther mass elongate; pollen yellow. Styles numerous (30–40), glabrous or sometimes ascending-strigose; stigmas

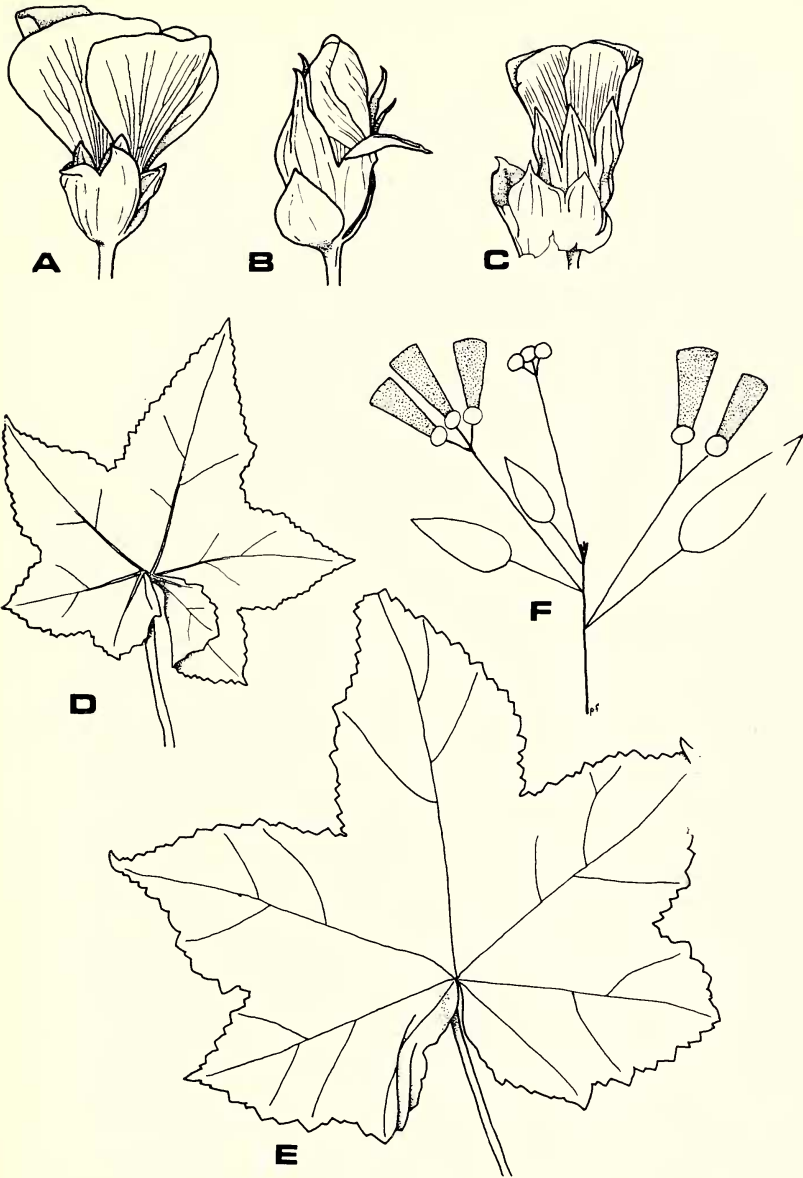


FIG. 7. *Phymosia rosea*: A, flower (Skutch 1025), $\times \frac{1}{2}$; B, flower (Hinton 8946), $\times \frac{1}{2}$; C, flower (Hinton 15423), $\times \frac{1}{2}$; D, leaf (Matuda 4637), $\times \frac{1}{2}$; E, leaf (Zuccarini s.n.), $\times \frac{1}{2}$; F, inflorescence diagram (Hinton 3800), $\times \frac{1}{4}$.

unilaterally decurrent, glabrous. Fruits oblate, 2–3½ cm diameter; mericaps 30–40, 15–32 mm long. Seeds 3 mm long. Figs. 7, 9.

Specimens examined. MEXICO: without locality, Liebmann 1208 (UC, US), Sartorius 8000 (US); Veracruz: Orizaba, Botteri 898 (GH),

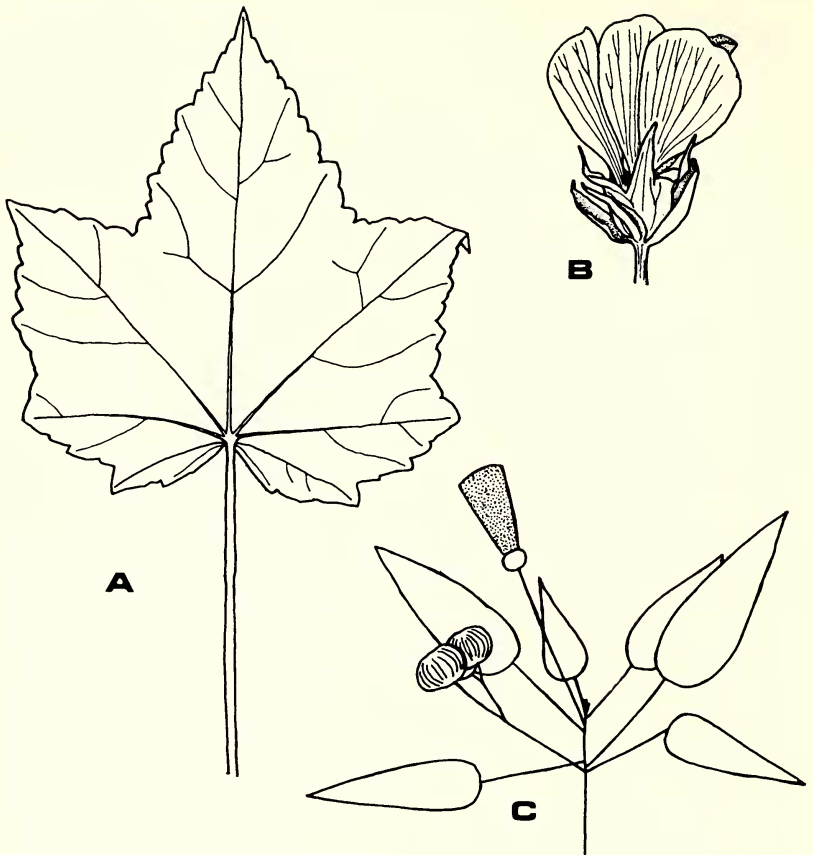


FIG. 8. *Phymosia rzedowskii* (all Rzedowski 24187): A, leaf, $\times \frac{1}{2}$; B, flower, $\times \frac{1}{2}$; C, inflorescence diagram, $\times \frac{1}{4}$.

Lomagrande, Mt. Orizaba, *Balls* 5369 (US); Jalisco: near Autlán, *McVaugh* 23098 (ENCB, MICH); Michoacan: Tancitaro (Distr. Uruapan), *Hinton* 15720 (F, GH, MO, NA, UC, US), Patamban, *Nelson* 6553 (GH, US); Guerrero: 3 km SW de Omiltemi (munic. Chilpancingo), *Rzedowski* 23602 (ENCB), near Camotla (munic. Chichihualco), *Rzedowski* 16459 (ENCB, MICH) 18016 (ENCB, MICH, TEX), Filo de Caballos (munic. Chichihualco), *González Quintero* 36 (ENCB); Mexico: Distr. Temascaltepec: Cajones, *Hinton* 3035 (US), 5421 (F, GH), 5597 (MICH), 7468 (US), 7469 (GH, US), 7471 (UC, US), 8946 (ARIZ, F, GH, US), 15423 (GH, NA, UC, US), Cumbre *Hinton* 5781 (US), 7481 (DS), 8632 (GH, US), San Miguel, *Hinton* 5593 (GH), Tequesquipan, *Hinton* 3800 (F, GH-2 sheets), Cerro de Sacromonte, cerca de Amecameca, *Hernández* s.n., 5 Aug 1967 (ENCB); Puebla: Alta Luz, *Purpus* 2628 (UC); Oaxaca: near Suchixtepec, *Rzedowski* 19655 (ENCB), between Juchatengo and San Gabriel Mix-

tepec, *McVaugh* 22466 (ENCB, MICH); Chiapas: in cult., Zinacantan, *Laughlin* 356 (DS, MICH), Mt. Male near Porvenir, *Matuda* 4637 (MO), near San Cristóbal, *Nelson* 3236 (US-2 sheets), Chiquihuite, *Matuda* 2835 (F, GH, MICH, MO, NA, US); GUATEMALA: Dept. Huehuetenango: near Nentón, *Nelson* 3236 (GH), between San Miguel Acatan and Soloma, *Skutch* 1025 (F, GH, US), San Mateo Ixtatán, *Breedlove* 8710 (DS), 11572 (DS), Todos los Santos, *C. & E. Seler* 2733 (GH, US), San Pedro Soloma, *Moncure* s.n., Aug 1950 (F), Huehuetenango, *Standley* 65724 (F), La Sierra (Tujimach) across river from San Juan Atitlan, *Steyermark* 52008 (F, US); Dept. El Quiché: Sacapulas, *Hawkes* et al. 1745 (F); Dept. San Marcos: NW of San Marcos, *Steyermark* 35588 (F); Dept. Totonicapan: between San Francisco El Alto and Momostenango, *Standley* 83982 (F, US) 84087 (F); Dept. Chimaltenango: NW of Patzún, *Fryxell* 1196 (DS, NA, US), Chichivac, *Skutch* 391 (US); Dept. Sacatepequez: near Antigua, *Kellerman* 7100 (F); Dept. Guatemala: Volcán de Pacaya, *Standley* 80500 (F), in cult. *J. Donnell Smith* 1902 (US), in cult. Las Calderas, *Standley* 58303 (F); Dept. Jalapa: Volcán Jumay, *Steyermark* 32393 (F), Montaña Miramundo, *Steyermark* 32799 (F); Dept. Alta Verapaz: Purulha, *Cook & Doyle* 90 (F, US). In cultivation: *Zuccarini* s.n. (BR, M).

This taxon, as here defined, is a highly variable one. Others may dispute the conservative interpretation I have adopted. However, I was unable to resolve the variation within this taxon into discrete entities, a difficulty that Standley and Steyermark (1949) experienced with the Guatemalan material. Initially I envisioned three taxa, separated principally on the form of the involucre and the relative development of the calyx. This interpretation was found to correlate very poorly, if at all, with geographical distribution; a further search for correlated morphological characters (flower color, fruit size, type of vestiture, form of leaf serration, etc.) proved fruitless. The possibility of defining even infra-specific taxa (one, say, with a gamophyllous involucre, another with three, discrete involucral bractlets), which at first glance seems obvious, cannot be substantiated by closer scrutiny.

This type of variability, where the patterns are not abruptly discontinuous, is in part characteristic of the genus (and of other malvaceous genera) and in the present instance is perhaps accentuated by the history of cultivation of *P. rosea*. This species has the largest, showiest flowers of the genus, more than one flower-color form, and probably a long history of cultivation (cf. Standley and Steyermark, 1949). I have made no intensive study of the history of cultivation of this species, but I suspect it has been grown as an ornamental since pre-Columbian times. A broader range of variability is to be expected in a plant with such a history of cultivation.

The vernacular names that have been recorded for *P. rosea* include "Malvavisco" (*Hinton* 4109) and "Malvon" (*Hinton* 3800) in Mexico;

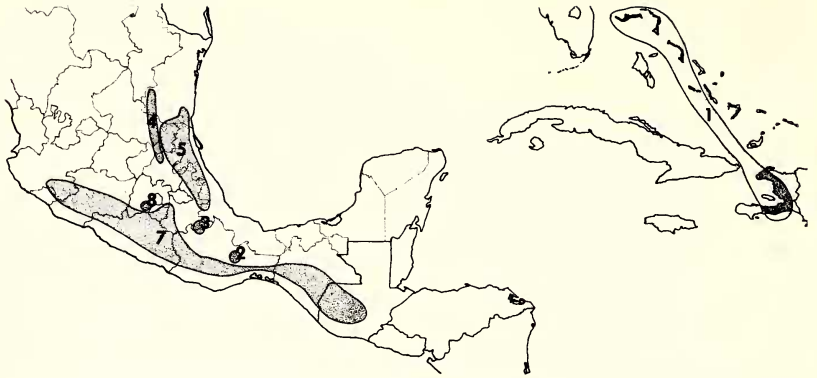


FIG. 9. Generalized distribution map of species of *Phymosia*, excepting *P. anomala*, numbered as in text.

and "Aguamecate" (*Steyermark 32799*), "Amapola" (*Standley 58303, 65724, Steyermark 52008*), "Ech" (also *Steyermark 52008*), and "Amanda" (*Standley and Steyermark 1949*) in Guatemala.

Phymosia rosea is found at relatively high elevations from Guatemala on the south to the Mexican state of Jalisco on the north, primarily on the Pacific watershed. It is only sporadically represented in the intervening regions, possibly because areas that are at sufficiently high elevation for this species have not been as well explored botanically. *P. rosea* has been collected at elevations of 1600 m to over 3000 m.

8. *Phymosia rzedowskii* Fryxell, sp. nov. Frutex usque ad 4 m altus. Ramunculi dense tomentosi; pilis stellatis, $\frac{1}{2}$ mm diam., 15–20 ramosis, pallidis, saepe stipitatis praesertim in petiolis ubi stipites usque ad 1 mm longi sunt. Folia usque ad 12 cm longa, cordata, crenata, plerumque 5-lobata, acuta vel acuminata, 7–9 nervata, moderate tomentosa infra (pilis stellatis), sparse tomentosa supra (pilis numero brachiorum deminutis, brachiis plus minusve ascendens); margines foliorum crenati perspicue, dentibus latoribus quam longioribus, inter se semotis (1–3 in quoque cm), rotundatis, manifeste distinguilibus inter se. Petioli tomentosi, quam laminae $\frac{1}{2}$ – $\frac{2}{3}$ longiori. Stipulae moderate tomentosae, ca. 1 cm longae. Pedunculi 7–13 cm longi, interdum ramificantes infra articulos pedicellorum, stramini-tomentosi, 1–3 florentes, umbellati. Involucra ad basem calycum inserta, persistentia in statu fructendo; bracteolae involucrorum 3, distinctae, 20–30 mm longae, 4–11 mm latae, sessiles, lanceolatae, sparse stellato-tomentosae. Calyces 25–35 mm longi, dense stramini-tomentosi; lobi calycum 8–13 mm lati ad basem, 15–20 mm longi, triangularis, acuti vel acuminati, 3-costati. Petala 5–6 cm longa, 3–3 $\frac{1}{2}$ cm lata, praeter in margine unguium ciliatis (pilis usque ad 2 mm) glabra, atrovinosa. Columna staminalis quam petala brevior, 2 $\frac{1}{2}$ mm diam., antherifera in dimidio supero; fila 5–6 mm longa; cumulus antherarum elongatus; antherae vinosae; pollen

flavum. Styli numerosi (30–35), glabri (saltem supra); stigmata secundatim decurrentia, glabra. Fructus oblatis, 3–4 cm diam.; carpida 30–35, reniformia, complanata, 25–30 mm longa. Semina 3 mm longa. Figs. 8, 9.

Holotype. MEXICO: México (Estado de): 2 km al SE de San Pablo Ixayoc, munic. de Texcoco; fondo de cañada con vegetación de bosque de *Alnus* con *Abies*, *Fraxinus*, y *Quercus*; arbusto de 4 m de alto; flores de color rojo vino obscuro; alt. 2600 m, *Rzedowski 24187*, 3 Aug 1967 (ENCB; isotypes ENCB, MICH).

Phymosia rzedowskii is known only from the type collection. It recombines certain of the characters of *P. umbellata* and *P. rosea*, but is evidently distinct from either. It has burgundy petals with ciliate claws like the former species, but has flowering and fruiting structures (petals, calyx, carpels) of a size comparable to the latter species. Its involucreal bracteoles are distinctive, as are its long filaments and purple anthers.

ACKNOWLEDGEMENT

I wish gratefully to acknowledge the helpful correspondence that I have had with David M. Bates (Ithaca, New York) and Antonio Krapovickas (Corrientes, Argentina) in the preparation of this revision. Both have shared freely of their knowledge of the Malvaceae generally and of *Phymosia* in particular. The responsibility for the opinions expressed, however, is wholly my own.

EXCLUDED SPECIES

Phymosia acerifolia (Greene) Rydberg = *Iliamna rivularis* (Dougl.) Greene

Phymosia crandallii (Rydb.) Rydb. = *Iliamna crandallii* (Rydb.) Wiggins

Phymosia cuspidata (Britt.) Britt. = *Sphaeralcea cuspidata* Britt.

Phymosia grandiflora (Rydb.) Rydb. = *Iliamna grandiflora* (Rydb.) Wiggins

Phymosia longispala (Torr.) Rydb. = *Iliamna longispala* (Torr.) Wiggins

Phymosia remota (Greene) Britt. in Britt. & Brown = *Iliamna remota* Greene

Phymosia rivularis (Dougl.) Rydb. = *Iliamna rivularis* (Dougl.) Greene

LITERATURE CITED

- BARKER, H. D., and W. S. DARDEAU. 1930. Flore d'Haiti. Port-au-Prince.
 BATES, D. M. 1968. Generic relationships in the Malvaceae, tribe Malveae. *Gentes Herb* 10:117–135.
 ———. 1969. Systematics of the South African genus *Anisodonteia* Presl (Malvaceae). *Gentes Herb*. 10:215–383.
 ———, and O. J. BLANCHARD, JR. 1970. Chromosome numbers in the Malvales. II. New and otherwise noteworthy counts relevant to classification in the Mal-

- vaceae, tribe Malveae. *Amer. J. Bot.* 57:927-934.
- BRITTON, N. L., and C. F. MILLSPAUGH. 1920. *The Bahaman Flora*. New York.
- CHAUDHURI, S. K. 1965. Pollen morphological studies of the order Malvales. II. *Bull. Bot. Soc. Bengal* 19:147-158.
- DILLENIUS, J. J. 1732. *Hortus Elthamensis*. London.
- FRYXELL, P. A. 1972. A revision of the genus *Robinsonella* (Malvaceae). *Gentes Herb.* (in press).
- GRISEBACH, A. H. R. 1859. *Flora of the British West Indian Islands*. London.
- HAMILTON, W. 1825. *Prodromus Plantarum Indiae Occidentalis*. London.
- KEARNEY, T. H. 1935. The North American species of *Sphaeralcea* subgenus *Eusphaeralcea*. *Univ. Calif. Publ.* 19:1-128.
- . 1951. The American genera of Malvaceae. *Amer. Midl. Naturalist.* 46: 93-131.
- MUHLENPFORDT, E. A. E. 1839. Ausflug an die Ufer der Südsee in Frühjahr 1829. *Ausland* 12:361-362; 366-367; 370-371; 374-375; 378-379; 609-610; 614-615; 618-619; 622-623; 625-627; 630-631; 634-635; 637-639; 642-643; 646-648; 673-674; 678-679; 681-683; 685-687; 689-690.
- PERSOON, C. H. 1807. *Synopsis plantarum*. 2:250.
- SAVAGE, S. 1945. *A catalogue of the Linnaean Herbarium*. Taylor & Francis Ltd. London.
- SCHMIDT, H. 1965. Der "Hortus Elthamensis" aus der Bibliothek Carl von Linné. *Feddes Repert. Spec. Nov. Regni Veg.* 70:69-108.
- SKOVSTED, A. 1935. Chromosome numbers in the Malvaceae. I. *J. Genet.* 31:263-296.
- SOUSA SÁNCHEZ, M. 1969. Las colecciones botánicas de C. A. Purpus en México, periodo 1898-1925. *Univ. Calif. Publ. Bot.* 51:1-36.
- STANDLEY, P. C. 1923. Trees and shrubs of Mexico. *Contr. U. S. Natl. Herb.* 23: 767-768.
- , and J. A. STEYERMARK. 1949. *Flora of Guatemala*. *Fieldiana, Bot.* 24(b): 381-383.
- TAKHTAJAN, A. 1969. *Flowering plants origin and dispersal*. Smithsonian Institution Press, Washington.
- WEBBER, J. M. 1936. Chromosomes in *Sphaeralcea* and related genera. *Cytologia* 7:313-323.
- WIGGINS, I. L. 1936. A resurrection and revision of the genus *Iliamna* Greene. *Contr. Dudley Herb.* 1:213-229.

REVIEWS

Manual of the Vascular Plants of Texas. By DONOVAN S. CORRELL and MARSHALL C. JOHNSTON. Frontispiece, xvi + 1881 pp., 2 maps. Contributions from Texas Research Foundation, Vol. 6, Texas Research Foundation, Renner, Texas 75079. 1970. \$35.00.

The state of Texas has a most strategic position within North American biogeography and this is one especially important reason why the availability of a *Manual of the Vascular Plants of Texas* is welcomed by biologists.